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AUG 28 2006

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U.S. Serial No. 10/674,317
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Claims 1, 3-7, and 10-15 are pending in the application. Independent claims 1 and 5 have been amended to incorporate the subject matter of claims 2 and 8, which are canceled without prejudice. The amendments are fully supported by the application as originally filed.

Applicants' claimed invention is directed to a ground pad structure including: a ground plane provided on a dielectric layer and covered by a solder mask layer of a substrate, and a plurality of ground pads formed on the ground plane and exposed from openings of the solder mask layer, where a part or some of the ground pads located on the circumference of the ground plane are non-solder mask defined (or "NSMD") ground pads (see independent claims 1 and 5).

In other words, the ground pads can be divided into two groups: a first group containing solder mask defined "SMD" ground pads, and a second group containing the NSMD ground pads protruding from and partially extending from the circumference of the ground plane (see independent claims 1 and 5).

For example, referring to FIGS. 8 and 9 of the application, a plurality of NSMD ground pads 203 are disposed along the circumference of the ground plane 208. The NSMD ground pads 203 protrude from the circumference of the ground plane 208 (see, e.g., FIG. 9), and partially extend from the circumference. As a result, the outer portion of the ground solder means 112a can contact the ground pads 203, which provides good adhesion and can prevent electrical shorts or bridges (see specification at page 11, last paragraph to page 12, first paragraph).

Claims 1-6 and 9-15 were rejected under 35 USC 103(a) as being unpatentable over "applicant's admitted prior art" ("AAPA") in view of U.S. Patent Application Publication US 2004/0113285 to Tay et al. ("Tay"). Claim 7 was rejected under 35 USC 103(a) as being

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unpatentable over AAPA in view of U.S. Patent 5,541,450 to Jones¹. These rejections are respectfully traversed.

AAPA and Tay, whether taken alone or in combination, do not teach or suggest a ground pad structure or semiconductor package in which a plurality of ground pads are formed on a ground plane, including some non-solder mask defined ground pads protruding from and partially extending from the circumference of the ground plane.

On page 3, lines 1-4 of the Office Action of 04/26/2006, it was admitted that AAPA does not teach or suggest at least "a part of the ground pads, which are located on the circumference of the ground plane are non-solder mask defined ground pads, such that a portion of the dielectric layer surrounding the non-solder mask defined ground pads is exposed [from] the solder mask layer."

FIG. 5C and paragraph 0025 of Tay were cited for allegedly disclosing the above feature.

In Tay, referring to FIG. 5C, interconnect material 22 is provided on a "non-dielectric defined interconnect" 32, such that a portion of the interconnect material 22 is defined by a dielectric 52, and the remaining portion of the interconnect material 22 is not defined by the dielectric 52, but instead is defined by a substrate 56 (see paragraph 0028 of Tay).

As described in Tay, the bonding structure is designed to prevent crack initiation and propagation in electrical interconnections by forming the interconnect 32 as a hybrid of a dielectric defined and a non-dielectric defined interconnect (see, e.g., paragraph 0025 of Tay).

However, there is no teaching or suggestion of a solder mask layer covering the dielectric layer 52 in Tay (see independent claims 1 and 5). Instead, the interconnect material 22 directly contacts the dielectric 52 and the underlying substrate 56. Therefore, with the arrangement of

¹ In the Office Action, claim 7 was rejected over AAPA in view of Jones. However, claim 7 depends from claim 5, which was rejected over AAPA in view of Tay. Therefore, it is unclear whether the Tay reference was meant to be included in the rejection of claim 7.

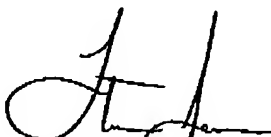
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Tay, it is possible that molten solder bumps may extrude and flood over to adjacent interconnects, resulting in the possibility of electric shorts and bridges. Moreover, while the Applicants' claimed invention recites the use of ground pads some of which are non-solder mask defined ground pads (and others being solder mask defined ground pads), the Tay reference only discloses the hybrid interconnect structure described above.

For at least the reasons discussed above, AAPA and Tay, whether taken alone or in combination, do not teach or suggest the Applicants' claimed invention. Therefore, independent claims 1 and 5, and their respective dependent claims, patentably distinguish over the proposed combination of AAPA in view of Tay.

It is believed the application is in condition for immediate allowance, which action is earnestly solicited.

Respectfully submitted,



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Date: August 28, 2006

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